SCHEME OF COURSE WORK

Course Title	: Computer Aided Manufacturing			
Course Code	: 19ME2105	L T P C	:3 0 0 3	
Program:	: M.Tech.			
Specialization:	: CAD/CAM			
Semester	: II			

Course Outcomes (COs):

At the end of the course, the student will be able to

1	Explain NC, CNC, DNC and other system devices.
2	Discuss the different features of NC machine tools and programmable logic controllers.
3	Develop NC part program for various machining operations.
4	Describe the application of adaptive control in CNC machine and other manufacturing.
5	Use different quality control equipment.

Program Outcomes (POs)

At the end of the program, the students in CAD/CAM will be able to

1. acquire fundamentals in the areas of computer aided design and manufacturing
2. apply innovative skills and analyze computer aided design and manufacturing problems critically
3. identify, formulate and solve design and manufacturing problems
4. carry out research related to design and manufacturing
5. use existing and recent CAD/CAM software
6. collaborate with educational institutions, industry and R&D organizations in multidisciplinary teams
7. apply project and finance management principles in engineering projects
8. prepare technical reports and communicate effectively
9. engage in independent and life-long learning and pursue professional practice in their specialized areas of CAD/CAM
10. exhibit accountability to society while adhering to ethical practices
11. act independently and take corrective measures where necessary

Course Outcome versus Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO-1	S	S	M	M					M			
CO-2	S	M	M	M					M			
CO-3	M	M	M						M			
CO-4	S	M	M	M					M			
CO-5	M	M		M					M			

S - Strongly correlated, *M* - *Moderately* correlated, *Blank* - *No correlation*
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Teaching-Learning and Evaluation

WEEK	TOPIC / CONTENTS	COURSE OUTCOMES	SAMPLE QUESTIONS	TEACHING-LEARNING STRATEGY	ASSESSMENT METHOD & SCHEDULE
1	Introduction: Basic components of NC system, coordinate systems,	CO1	1.With diagram, explain the basic components of NC system. 2. Differentiate between NC, CNC and DNC. 3. Explain the various types of actuators. 4. Describe various types of feedback device used in CNC.	Lectures, PPT, Seminar	
2	classification of NC motion control system, CNC, DNC	CO1			
3	applications of NC, analysis of positioning system. System devices: sensors	CO1			
4	, , actuators, analog to digital convertor, encoder.	CO1			Seminar (week 3-7)
5	Features of NC machine tools: Design considerations of NC machine tool, machining center,	CO2	1. Explain the various modes of operation in CNC machine. 2. Discuss the features of machining center. 3. Discuss the ladder logic diagram used for programming PLC. 4. Describe the various components of PLC.	Lectures, PPT, Seminar	
6	turning center, mode selection, cutter radius and tool length compensation.	CO2			
7	Programmable logic controllers: Components of PLC, programming the PLC, programmable automation controllers.	CO2			
8	NC part programming: Preparatory function, miscellaneous function, interpolation, canned cycle,	CO3			
9	Mid-Test 1	CO-1, CO-2			

10	manual part programming for drilling, and milling operations, Programming examples	CO3	1. Write a part program for drilling operations for given samples. 2. Write a part program for contouring operations for given samples. 3. Write a part program for step turning operations for given samples. 4. Write a part program for taper turning operations for given samples.	Lectures, PPT, Seminar	
11	manual part programming for turning operation, Programming examples.	CO3			
12	Adaptive control systems: sources of variability in machining, benefits of adaptive control,	CO4	1. List any three advantages of adaptive control. 2. Explain the various cases where reverse engineering is used. 3. Describe the applications of rapid prototype. 4. Write a short note on agile manufacturing.	Lectures, PPT, Seminar	Seminar (week 11-15)
13	adaptive control with optimization, adaptive control with constraints. Rapid prototyping	CO4			
14	Rapid prototyping-basic process, techniques, applications, reverse engineering, agile manufacturing.	CO4			
15	Inspection Technologies: Inspection fundamentals, Contact inspection techniques, Coordinate measuring machine,	CO5	1. Explain any one type of coordinate measuring machine. 2. Describe the working principle of machine vision. 3. Explain the concept of six sigma.	Lectures, PPT, Seminar	
16	Noncontact inspection techniques, machine vision, laser system	CO5			
17	surface measurement, six sigma.	CO5			
18	Mid-Test 2	CO-3, CO-4, CO-5			
19/20	END EXAM	All Cos			